Section 32 Evaluation Report for the Proposed Otago Land and Water Regional Plan

Chapter 19: Wastewater

This Section 32 Evaluation Report should be read together with the Proposed Otago Land and Water Regional Plan

Otago Regional Council

List of figures

List of tables

Abbreviations

DCC	Dunedin City Council
CDC	Clutha District Council
CODC	Central Otago District Council
FMU	Freshwater Management Unit
NES	National Environmental Standard
NPS	National Policy Statement
NPSFM	National Policy Statement for Freshwater Management 2020
ORPS	Otago Regional Policy Statement 2019
OWTS	Onsite Wastewater Treatment System
pORPS	Proposed Otago Regional Policy Statement 2021
pLWRP	Proposed Otago Land and Water Regional Plan 2024
QLDC	Queenstown Lakes District Council
RPS	Regional Policy Statement
RPW	Regional Plan: Water
RMA	Resource Management Act 1991
TA	Territorial Authority
WDC	Waitaki District Council
WWTP	Wastewater Treatment Plant

Wastewater [WW] - Assessment of provisions

1. WW – Wastewater - Reticulated

1.1. Introduction

1. For the purpose of this chapter, wastewater is split into two categories. Reticulated wastewater includes any wastewater from a scheme that services more than one property and includes biosolids from reticulated wastewater systems. In section 2, onsite wastewater discharges are discussed. These include any wastewater which is discharged on the same property from where the waste originates. These include discharges from onsite wastewater treatment systems (both domestic and industrial/commercial), discharges from long drops and composting toilets and discharges of greywater and discharges of industrial and trade waste.

1.1.1. Definition

2. Wastewater is any combination of two or more of the following types of wastes: sewage, greywater, or industrial and trade waste[1]. A reticulated system is any system that collects wastewater from more than one property. This could be a small residential development, a wastewater scheme that accepts and treats the town's sewage, or a municipal sewerage[2] system. Raw wastewater from multiple sites is collected and conveyed by pumps and pipes to a treatment plant before the final waste products (treated wastewater and biosolids) are discharged to water, land, or the coast. Onsite wastewater is discussed in section 2 of this chapter.

1.1.2. Treatment

3. When raw wastewater reaches a treatment plant it is separated into sludge and liquid waste. The sludge is transported offsite, and either disposed to landfill, or treated and stabilised as biosolids that can be safely and beneficially applied to land under certain circumstances. The liquid waste stream typically undergoes a series of treatment processes to reduce suspended solids and contaminants. The main contaminants of concern are suspended solids, phosphorus, pathogens (usually indicated by *E. coli*), and nitrogen. Treatment processes tend to be either biologically or mechanically based and can include oxidation ponds, filtering, aeration, and UV treatment (GHD, 2020). Oxidation ponds provide good treatment for domestic wastewater, but wastewater containing trade and industrial wastes require additional treatment. The final treated liquid waste should be clean enough to safely dispose of to land, water, or the coast.

4. Wastewater discharges to land can be slow-rate or fast-rate. Slow-rate discharge can be achieved by subsurface drippers or irrigation, and the discharge undergoes further treatment as the soil filters out contaminants. When it is growing season, soils can effectively filter out all contaminants before the discharge reaches groundwater. Slow rate provides

[1] National planning standards definition

[2] Sewage refers to the waste that is discharged, whereas sewerage/sewers are the structure that the discharge goes into.

better treatment and requires large land area. Fast rate discharge can be via a rapid infiltration basin, which is a large sink dug into the ground. In this scenario, the soils do not provide much filtering before the discharge reaches groundwater and can result in elevated nitrogen and bacteria in the groundwater (Moran, McKay, Bennett, West, & Wilson, 2018).

5. Wastewater discharges to water rely on appropriate treatment before being discharged, and average or above average flows. If a river has low flows, the introduction of wastewater can affect the water quality. Discharges directly into water are a significant issue for iwi.

6. Wastewater discharges to the coast will not be discussed in detail, as these discharges are not managed by the pLWRP.

1.1.3. Overflows

7. Most reticulated systems include overflow points in their design where excess wastewater can discharge during heavy rainfall events. Heavy rainfall can overwhelm wastewater systems due to historical cross-connections between stormwater and wastewater pipes. Undirected overflows can result in untreated wastewater blocking up the sewage pipes and re-entering houses or flooding streets. To avoid the associated human health risk, overflow points direct such wet-weather overflows to rivers or the coast. Wet-weather overflows can be minimised by ensuring pipe capacity is sufficient for heavy rainfall events.

8. Dry-weather overflows are the result of blockages or system failure. Blockages can be due to fat, oil, grease build-up, or tree root intrusion. System failure or equipment damage may include, power outages, mechanical pump failure or a build-up of solids which clog the treatment equipment. Dry weather overflows can usually be minimised or even avoided by ensuring the system has sufficient capacity and regular maintenance.

1.1.4. Biosolids

9. Biosolids are the remaining stabilised solids from treated sewage sludge. In Otago, sludge is not processed into biosolids, rather it is sent to landfill (Eunomia Research and Consulting, 2023). While there are environmental risks associated with the application of biosolids to land, management of these risks are perhaps more favourable than sending biosolids into landfills. Overseas, biosolids are commonly used as a fertiliser. In the United Kingdom and Australia, 80% of biosolids are applied to land, while in the United States 50% is applied to land. In New Zealand only 16% of biosolids are applied to land (Tinholt, 2019).

1.2. Issues

10. In general terms, the resource management issues the WW chapter in the LWRP seeks to address are:

    a. Direct discharges to water are offensive to mana whenua.

    b. Wastewater discharges affect water quality.

    c. Biosolids disposal can affect water quality, soil health and use of land.

11. Each of these issues is described in turn below.

12. Additional policy issues with the status quo policy context that the WW chapter seeks to address are outlined in Section 1.3 of this chapter.

1.2.1. Direct discharges to water are offensive to mana whenua

13. The discharge of wastewater (whether treated or untreated) to water is contrary to tikaka (Maori custom and traditions). It renders affected waterways inaccessible for customary practices, such as harvesting and eating mahika kai or using water for cultural purposes and rituals. “For Ngāi Tahu ki Murihiku, discharge to land is considered a better option than discharge to water, as discharging to land allows Papatūānuku to filter and cleanse contaminants from the discharge in a natural way, before the discharge enters the hydraulic system.” (Ngāi Tahu ki Murihiku, 2008). Regardless of the level of treatment, the direct discharge of wastewater to water is offensive to mana whenua.

1.2.2. Wastewater discharges affect water quality

14. Otago’s State of the Environment report notes that water quality is generally poorer at sites located on smaller, low-elevation streams that drain agricultural or urban catchments, including the Lower Clutha Rohe, Dunedin and Coast FMU, and North Otago FMU (Ozanne, Levy, & Borges, 2023). Furthermore, elevated *E. coli* and nitrate concentrations were generally observed in areas with intensive land use, septic tanks, and insecure bores.

15. Water quality issues related to wastewater are more visible for towns on poorly drained land than towns on medium to well drained land. Where land is poorly drained, wastewater can pond and flow towards rivers, lakes, streams, and estuaries (Moran, McKay, Bennett, West, & Wilson, 2018).

16. Both treated and untreated wastewater can affect water quality. As noted in the introduction, fast-rate disposal of wastewater to land can result in elevated nitrogen entering groundwater. Untreated wastewater enters water bodies usually as a result of an overflow situation. Untreated wastewater discharges into freshwater bodies can create significant adverse effects on ecosystem health and

1.2.3. Biosolids disposal can affect water quality, soil health and use of land

17. Once treated, biosolids from wastewater can be used as a fertiliser. However, cultural, and social beliefs prevent biosolids from being used on land for grazing of animals or growing of crops for human consumption. Additionally, the application of biosolids must be done so as to prevent freshwater or soil contamination.

18. Environmental risks, such as the contamination of groundwater or surface water, can be managed through biosolid application methods. The risk of nitrate leaching to groundwater from biosolids can be reduced by matching the application rate to the nutrient needs of the crops (New Zealand Water and Wastes Association, 2003). Surface water contamination risk can be reduced by only disposing of biosolids on flat land, with appropriate setback distances from water bodies.

19. All wastes that originate from humans should not be disposed of at sites or in ways that are offensive to mana whenua. Iwi issues related to the application of biosolids to land include (New Zealand Water and Wastes Association, 2003):

    a. potential for contamination of food sources,

    b. proximity to sites of food preparation, harvesting and processing,

c. potential contamination of water bodies,

d. the need for potential mitigation measures (e.g., riparian planting),

e. avoiding applying biosolids on, or in the vicinity of, wahi tapu (sacred sites),

f. potential constraints on future land-uses as a consequence of biosolids applications (e.g., land subject to Treaty of Waitangi claims),

g. monitoring requirements.

1.3. Status quo policy context (including operative regional plan provisions)

20. This section provides an overview of the management of wastewater through the status quo policy framework: the pORPS and the current provisions in the RPW, as well as describing the issues associated with this approach.

1.3.1. pORPS

21. The pORPS sets out the following objective for land and freshwater (LF-FW-O1A) in relation to wastewater:

a. In each FMU and rohe in Otago and within the timeframes specified in the long-term visions in LF-VMO2 to LF-VM-O6[3] direct discharges of wastewater to water bodies are phased out to the extent reasonably practicable.

b. The timeframes are:

i. 2030 - Upper Lakes rohe

ii. 2035 - Catlins FMU

iii. 2040 - Dunedin & Coast FMU

iv. 2045 - Dunstan rohe, Roxburgh rohe

v. 2050 - Manuherekia rohe, Lower Clutha rohe, Taiari FMU, North Otago FMU

1.3.2. RPW

22. The existing RPW contains water quality objectives that relate to discharges managed in the WW chapter. The water quality objectives aim to:

a. maintain the quality of fresh water and enhance it where it is degraded.

b. enable the discharge of water or contaminants in ways that maintain water quality.

c. supports natural and human use values, including Kāi Tahu values.

d. have individuals and communities manage their discharges to reduce adverse effects, including those that are cumulative, on water quality.

[3] LF-FW – Fresh water Chapter of the pORPS.

e. avoid objectionable discharges of water or contaminants.

f. allow discharges of water or contaminants that have minor or less than minor adverse effects or that have short-term adverse effects.

23. Policy 7.B.4 directs decision makers for discharge permits to have regard to the ability of the land to assimilate the water or contaminants, any potential soil contamination, land instability, or adverse effects on water quality or use of coastal marine area for contact recreation and the gathering of seafood.

24. Discharges from reticulated wastewater systems are managed by two further policies[4] that were introduced through Plan Change 8 in 2022. These policies direct decision makers to prefer discharges to land over discharges to water unless the adverse effects associated with a discharge to land are greater than a discharge to water. They also require systems to be operated, maintained, and monitored in accordance with recognised industry standards; and promote the progressive upgrading of existing systems including to progressively reduce wet and dry weather overflows. All discharges of wastewater from reticulated wastewater systems require a discretionary consent.

1.3.3. Otago's wastewater schemes

25. As of 2018, Dunedin City Council serviced the most households, with approximately 50,000 connections, followed by Queenstown Lakes District Council with 21,130 connections.

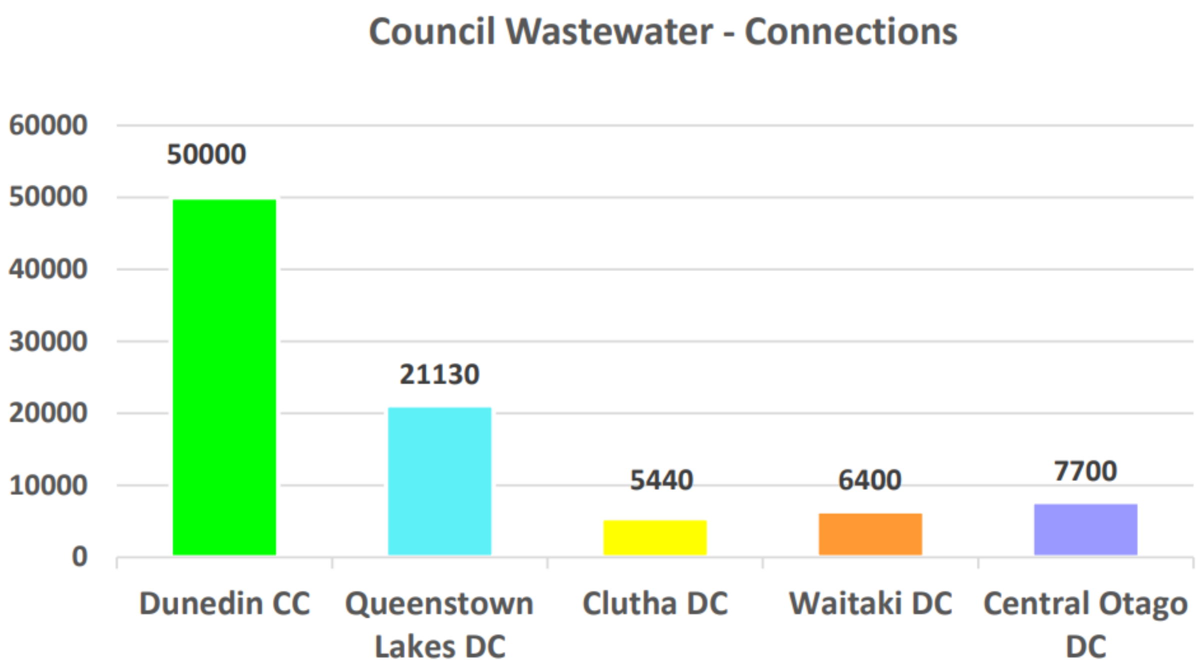

Figure 1: Reticulated wastewater connections by council (Emergency Management Otago, 2018)

26. One of ORC's recently granted consents (Davidson, 2021) shows the effectiveness of the current discretionary activity status for wastewater treatment plant discharges where regard was given to higher order documents. Consent granted for discharges from a new WWTP to be constructed in Kingston gives effect to the NPSFM and TMOTW. The wastewater

[4] 7.C.12 and 7.C.13

discharges from the future Kingston WWTP will be of high quality and disposed of to land using infiltration fields.

27. The policy direction from Plan Change 8 has not yet been fully implemented so there are still benefits and costs to occur. Only when all consents have been renewed under this policy framework will its effectiveness be fully realised. As demonstrated in Table 1 below, some discharge to water consents will not expire until around 2050 (e.g., Ranfurly and Heriot).

Table 1: Otago wastewater consents. Source: ORC data team.

FMU/rohe	Territorial Authority	Location	Activity	Consent Expiry
North Otago FMU	Waitaki District Council	Moeraki	Land	2053
		Palmerston	Land	2046
		Oamaru	Land & Water	2038
	Dunedin City Council	Waikouaiti	Land	2027
Dunedin & Coast FMU		Tahuna (Dunedin)	Coastal	2032
		Green Island/ Mosgiel[5]	Coastal	2032
		Warrington[6]	Land	2024
		Seacliff	Land	2041
	Clutha District Council	Milton	Water	2044
Catlins FMU		Kaka Point	Coastal	2046
		Owaka	Water	2045
Lower Clutha rohe		Balclutha	Water	2030
		Kaitangata	Water	2049
		Heriot	Water	2049
		Lawrence	Water	2046
		Stirling	Water	2045
		Tapanui	Water	2045
		Clinton	Water	2027
Taiari FMU		Waihola	Water	2028
	Dunedin City Council	Middlemarch	Land	2029
	Central Otago District Council	Naseby	Land	2051
		Ranfurly	Water	2050
Manuherekia		Alexandra	Land & Water	2038

[5] Mosgiel wastewater is conveyed to Green Island and discharged to ocean outfall at Waldronville.

[6] Warrington, Seacliff and Waikouaiti discharge to planted areas of sand dunes.

FMU/rohe	Territorial Authority	Location	Activity	Consent Expiry
		Omakau[7]	Water	2027
Roxburgh rohe		Roxburgh	Land	2045
		Clyde	Land	2035
		Lake Roxburgh	Land	2029
Dunstan rohe		Cromwell	Land & Water	2049
	Queenstown Lakes District Council	Queenstown / Shotover	Land	2031
		Hāwea	Land	2033
Upper Lakes FMU		Kingston[8]	Land	2057
		Wanaka (Project Pure)	Land	2043
		Cardrona	Land	2045

1.3.4. Non-compliance issues

28. Otago Regional Council has currently granted 33 consents for the discharge of treated wastewater from a municipal wastewater treatment plant. Of these consents 15 are discharges to fresh water, 15 are discharges to land and 3 are discharges to coastal water.

29. A 2023 audit (Regional Leadership Committee, 2023) noted 17 instances of significant non-compliance across all of Otago's territorial wastewater treatment plants (see Figure 2). When assessing a consent there are two types of non-compliance that can occur. The first type is process related where the consent holder is not complying with the requirements to submit reports, or report on specific activities. The second type is physical non-compliances where the plant is not operating in accordance with the consent and subsequent discharges do not comply with limits set in the consent conditions. While process related breaches may not have immediate environmental effects, they create a risk as ORC is not able to assess the operation for compliance. For this reason, ongoing process breaches may be classified as significant non-compliances with existing policy.

[7] The consent holder must prepare a strategy for the removal of the wastewater discharge to the Manuherekia river. The strategy must be provided to ORC by 30 June 2025.

[8] Kingston's wastewater system is consented, but not yet constructed.

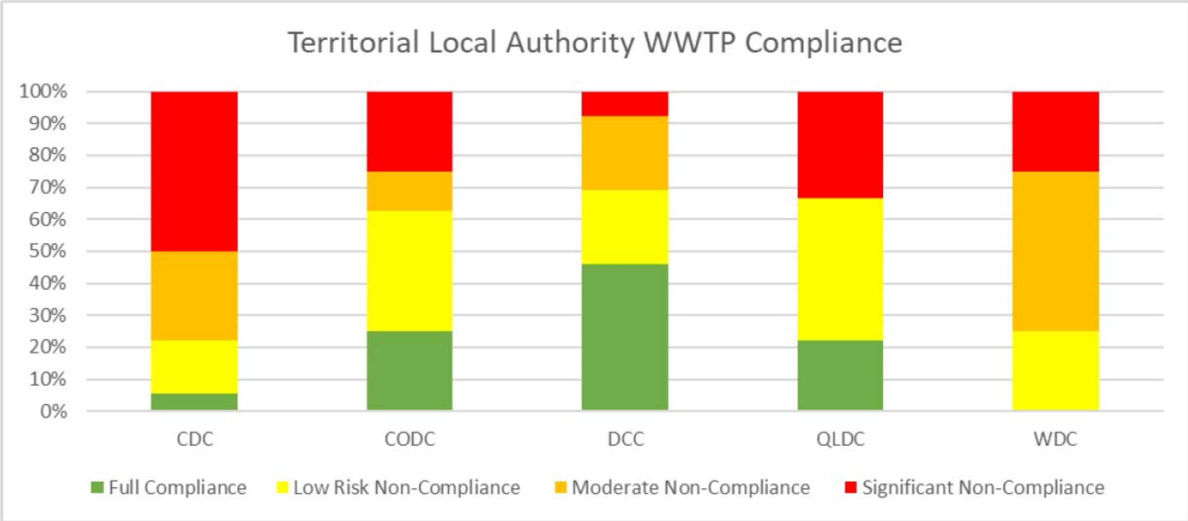

Figure 2: Consent compliance audit (Regional Leadership Committee, 2023)

30. Some non-compliance instances are due to overflows of untreated sewage from stormwater networks into rivers, lakes, or the coastal environment. There are two types of wastewater overflows: dry weather overflows and wet weather overflows. Dry weather overflows occur from system failure, which normally would be either blockage or pump failure, and may be related to poor maintenance. Wet weather overflows occur when the flow from a rainfall event exceeds the wastewater system capacity, at which time raw sewage is discharged from engineered overflow points. Overflow points are usually into rivers and streams, to keep the sewage away from streets and houses because of the human health risk.

31. If a resource user is not meeting consent conditions, then they are likely to be find more stringent requirements challenging. However, many of Otago's wastewater treatment plants are due for significant upgrades, and robust policies and clear requirements will assist territorial authorities in their long-term strategic planning. It is worth noting that infrastructure upgrades usually have multiple drivers because of the investment involved and the final cost of a project is unlikely to be attributable entirely to regional policy settings.

1.3.5. Biosolids

32. The RPW does not have a management framework for biosolids. Additionally, as of 2024, there is no beneficial reuse of biosolids in Otago, with wastewater sludge being either disposed of to landfill or incinerated at Dunedin's Tahuna wastewater treatment plant.

33. While biosolids can be beneficially reused, environmental guidelines such as the Guidelines for the Safe Application of Biosolids to Land in New Zealand (New Zealand Water and Wastes Association, 2003) need to be followed to ensure the quality of biosolids are suitable for land disposal, and the location and management minimise adverse environmental and human health effects.

34. The lack of guidance for the management of biosolids in the regional plans is a gap in Otago's environmental management.

1.4. Objectives

35. Section 32(1)(b) requires an examination of whether the provisions in a proposal are the most appropriate way to achieve the objectives. The objectives and environmental outcomes that are particularly relevant for this topic are:

a. The following objectives in the IM – Integrated management chapter:

i. IO-O1 Te mana o te Wai

ii. IO-O2 Relationship of Kāi Tahu to freshwater

iii. IO-O3 Long-term visions and environmental outcomes

iv. IO-O4 Ki uta ki tai/integrated management

v. IO-O5 Manahau āhuarangi/climate change

vi. IO-O8 Land and soil resources

vii. IO-O9 Community well-being

b. The following environmental outcomes included as objectives in chapters FMU1 to FMU5 (including chapters CAT1 to CAT5):

i. FMU1 to 5-O1 Ecosystem health

ii. FMU1 to 5-O2 Human contact

iii. FMU1 to 5-O3 Threatened species (habitat)

iv. FMU1 to 5-O4 Threatened species (recovery)

v. FMU1 to 5-O5 Mahika kai (condition)

vi. FMU1 to 5-O6 Mahika kai (access, harvest, and use)

vii. FMU1 to 5-O7 Natural form and character

viii. FMU1 to 5-O8 Drinking water supply (source water)

ix. FMU1 to 5-O9 Animal drinking water

x. FMU1 to 5-O10 Wāhi tupuna

xi. FMU1 to 5-O11 Taoka species

xii. FMU1 to 5-O12 Fishing

xiii. FMU1 to 5-O14 Cultivation, and production of food, beverages, and fibre.

c. WW-O1 - Wastewater.

36. The next section outlines how the objective will be achieved through the use of provisions in the LWRP. The topic is split into reticulated wastewater and biosolids, with management options for each assessed.

1.5. Sub-topic: Reticulated wastewater discharges

1.5.1. Reasonably practicable options

37. To achieve the relevant objectives, three options have been identified through the policy development process, which included community engagement, review of relevant provisions in other regional plans, and discussion in a series of council workshops:

a. **Option 1**: Status quo

b. **Option 2**: pLWRP - non-complying discharges to water (preferred option)

c. **Option 3**: Prohibit discharges to water

38. In assessing these options, it is noted that:

a. There are benefits yet to be realised from implementing the existing policies introduced by Plan Change 8.

b. Compliance issues will not be solved by new policy settings.

c. There are many factors (outside of the control of the LWRP) that will affect the affordability of new reticulated wastewater systems and upgrades to existing systems.

1.5.1.1. Option 1: Plan Change 8 (status quo)

39. Option 1 is a reasonably practicable option due to new policies being introduced in 2022. Any discharge from a wastewater treatment plant requires a discretionary consent.

40. The benefits of the status quo have not yet been fully realised. Policy direction preferring discharge to land over discharge to water will largely be implemented as consents come up for renewal (see table 3: Otago Wastewater Consents for consent expiry dates).

41. The RPW requires the implementation of appropriate:

a. Measures to progressively reduce the frequency and volume of wet weather overflows; and

b. Measures to minimise the likelihood of dry weather overflows occurring; and

c. Contingency measures to minimise the effects of discharges of wastewater as a result of system failure or overloading of the system.

42. Measures to reduce wet weather overflows include increasing capacity of pipes, pump stations and treatment plants. Measures to minimise dry-weather overflows include ensuring the system is fit for purpose and receives regular maintenance. Costs to upgrade wastewater treatment plants, pipes and pumping stations are detailed in the Table 2 below.

Table 2: Examples of costs to upgrade wastewater networks to minimise overflow points

There are many examples of wastewater overflow reduction projects in New Zealand and Australia. For example, Kaitaia (Heijs, Lees , & Watts), Christchurch (Wilson & O'Brien, 2019), Wellington (Cheong & O'Callaghan, 2016), Auckland (Watercare, 2022), Tasmania (Johns & Jessup, 2016). Such projects are complex and specific to each situation.

In Auckland, a preferred option was a 12,800m^3 underground storage tank (the capacity of 5 Olympic swimming pools) to provide storage for three major overflow structures at an estimated of $22 million. However, a smaller sized storage tank would be significantly cheaper.

In Christchurch past system upgrades (based on trial and error) to reduce wet weather overflow have not been as effective as hoped, despite costing more than $150 million. There remained an overflow volume of 38,000 m^3 to waterways and a further 40,000 m^3 overflows from 165 manholes during a 3-year ARI (average recurrence interval) storm. A plan to determine the costs to abate the remaining overflows, differentiated between manholes, “Priority 1” outfalls (cost below $500/m^3) and “Priority 2” outfalls (cost above $500/m^3). The optimised solution met the achieved capital cost savings of up to 32% to achieve an aspirational target of no overflows in a 3-year annual recurrence interval storm.

The Tasmania example evaluated environmental effects of combined sewer overflows on the Tamar River and provides concept costs for upgrade options.

In Kaitaia ‘pass forward,’ ‘storage,’ and ‘bisect and pump’ options were considered. There were diminishing returns on investment: a 76% improvement was possible for $4.0 million, an 89% improvement was $10.0 million, and a 95% improvement was $10.9 million. A 3-month ‘Average Recurrence Interval’ option was $50,000 for every percent improvement, while a 1-year option was $110,000 for every percent improvement). It was noted that in addition to monetary costs, other non-cost criteria should be considered. There are also costs to purchase land for land treatment of new wastewater discharges – and, without government subsidy, these costs are eventually passed on to ratepayers.

43. The RPW includes a preference for land discharge over water discharge. There has been much speculation that a discharge to land may be more costly than discharging to water. It is difficult to determine whether this is the case, due to many factors affecting cost (described in Table 3).

Table 3: Costs of discharges to land

Wastewater schemes are complex and context-specific, as is the case with all major infrastructure. Upgrades of these schemes usually occur for multiple reasons, because of the level of capital investment involved, and their planning is around the duration of a scheme’s discharge consents (Moran, McKay, Bennett, West, & Wilson, 2018). Consequently, it can be extremely difficult to separate out the costs and benefits of changing the type of discharge from the other reasons for an upgrade.

In very general terms, there are four main ways that a discharge of reticulated wastewater is changed from being ‘to water’ to being ‘to land.’

1. A disposal field is added to the existing wastewater treatment plant.
2. A pipeline conveys treated effluent from the existing wastewater treatment plant for discharge at a disposal field in a separate location.
3. A pipeline conveys raw effluent to another existing wastewater treatment plant with a disposal field in a separate location for treatment and then land disposal.
4. A new wastewater treatment plant based on land disposal is built for both treatment and discharge.

The relevant costs are those for meeting the discharge to land requirement, rather than the treatment of wastewater. These costs are those of the land disposal and/or a conveyance pipeline. Land disposal occurs by applying wastewater at either rapid or slow-rate infiltration. Rapid infiltration needs free draining soil and achieves limited treatment before the discharge reaches groundwater (Moran, McKay, Bennett, West, & Wilson, 2018). Slow infiltration needs a larger area of land and achieves more treatment if the land has an adequate unsaturated zone (Moran, McKay, Bennett, West, & Wilson, 2018). It is possible that, in certain situations, there may be additional costs if a scheme needs to be replaced before the end of its operational life.

Issues can arise with conveyance (e.g. distance, pumping systems, emergency bypass provisions) and the land used for disposal (e.g. drainage, permeability, topography, groundwater) (Moran, McKay, Bennett, West, & Wilson, 2018). Land that is suitable for wastewater application is typically close to towns, free draining and relatively flat ground (Moran, McKay, Bennett, West, & Wilson, 2018). Such land is usually highly productive agricultural land and in relatively small parcels. The area of land available can also be restricted because the dairy industry does not allow contact between wastewater and lactating cows (Moran, McKay, Bennett, West, & Wilson, 2018).

The process of implementing a wastewater treatment option can be time consuming and expensive, particularly where there is strong opposition to a wastewater treatment option and a lack of viable alternatives (Moran, McKay, Bennett, West, & Wilson, 2018). Achieving community acceptance is a key component of the total cost of any wastewater treatment system, whether the discharge is to water or to land.

The recent upgrade for the Te Anau wastewater scheme in Southland is a case in point. From when a working party began investigating options in 2006 for treatment and preferably land-based disposal, it took Southland District Council 13 years to address a range of community concerns and gain resource consents for the final preferred option. That option was a 19-kilometre pipeline from the existing site by Lake Te Anau and the Upukerora River for disposal to a 120-ha block of land just north of Manapouri via slow-rate sub-surface dripline irrigation. Now the Te Anau upgrade is completed, planning is currently underway for a pipeline to connect wastewater from Manapouri.

As a comparison of land needed for disposal between rapid and slow-rate infiltration, the Riversdale rapid infiltration scheme needed roughly 1 ha of land for the disposal area for a quarter of Te Anau's average flow. An indicative assessment of the land area needed for disposal of treated wastewater from the Winton Wastewater Treatment Plant was done to inform early discussions with Environment Southland around the feasibility of land disposal (GHD, 2020). At the time, the "upper bound" (or maximum) land area was estimated to be 60 to 70 ha for more rapid application and 150 to 170 ha for slower application.

As already mentioned, a requirement for 'discharge to land' is more about removing discharges of treated wastewater to water than improving the quality of the discharge. The removal of point-source discharges of contaminants from water is a long-term trend. This trend reflects that such discharges are generally less socially acceptable than discharges to land and human waste in particular is offensive to mana whenua and unacceptable to Kai Tahu. The performance of a discharge to land compared to a discharge to water for any particular scheme (assuming the same level of treatment) depends on its catchment context, particularly the environmental conditions (e.g., climate, soils, groundwater) and the sensitivity of the receiving environment (Moran, McKay, Bennett, West, & Wilson, 2018).

The costs and benefits of discharge to land scenarios were tested in Southland research for Gore, Mataura, Winton, Nightcaps, and Invercargill and detailed results are available in Part C of the Urban and Industry Report (Moran, McKay, Bennett, West, & Wilson, 2018). This research used a nominal cost of land of $40,000 per hectare, which for the reasons noted above, would be variable. In addition, Southland District Council has investigated land suitability for towns across Southland as part of developing and implementing its wastewater strategy. This strategy is intended to prioritise upgrades for a district with many schemes spread over a large geographic area and a relatively low rating base (Norquay, Evans, Bennett, Oldfield, & Bennett, 2018).

Central Otago Example (CODC, 2024)

The Central Otago District Council is currently developing a business case (Central Otago District Council, 2023) to explore options for the Omakau wastewater scheme as well as options for the separate Alexandra wastewater scheme. A wastewater scheme for Clyde (currently under construction), is progressively being connected to the Alexandra wastewater treatment plant. The options for Omakau include providing wastewater services for Ophir, which currently relies on on-site wastewater systems (i.e., not reticulated wastewater).

The current consented discharge from the Omakau wastewater treatment plant into Manuherekia River expires in 2027 while the consented discharge from the Alexandra plant into Mata-au Clutha River expires in 2038 (but a new solution needs to be confirmed by 2026 to ensure this is operational for connection of Clyde Stage 2 and 3 in 2030. Of the options considered in the business case, just one retains a river discharge for Alexandra at a capital cost of $67 million[9]. It was also the only option that did not increase carbon emissions. This option improves reliability and redundancy (i.e., capacity) of the existing wastewater treatment plant (built in 1988) and is described as the "Do Minimum". All of the other options are based on discharges to land. Beneficial irrigation of treated wastewater is considered here as a discretionary cost (i.e., a choice). Based on this range of options, it is estimated that the capital cost of only the land-based discharge for Alexandra is $28.6 million (the first land-based option without the basic upgrade of the existing plant and the cost of the river discharge). The estimated property costs are $115,000 per ha for 9 to 10 ha of Rapid Infiltration Basins (area depends on the option). The capital cost estimate for the conveyance of raw wastewater from Omakau to Alexandra is just over $19 million (Central Otago District Council, 2023). This cost needs to be offset against the alternative options for Omakau and Ophir: A new wastewater treatment plant for Omakau to replace its existing plant (built in 1965), at a minimum capital cost of $29.6 million; or A continuation of Ophir's on-site wastewater systems. The report used a GIS-based site selection methodology to assess the spatial relationship between the following factors: geology, distance to river, relative soil permeability, slope grade, and land use zoning, as well as wastewater disposal opportunity sites.

44. Another aspect of transitioning from water discharge to land discharge is the availability of suitable land. Suitable land is that which is close to the existing wastewater treatment plant or community area, is relatively flat, and has soils which ae neither porous nor clay. Porous soils may lead to contaminated groundwater supplies (if pre-discharge treatment is not high quality) while clay-like soils will lead to ponding or run-off. This is discussed in further detail in Table 4.

Table 4: Availability of land for wastewater discharge

Clutha District Example The Clutha District Council holds 10 of the 15 discharge consents for the discharge of wastewater to water in Otago. A report was commissioned to assess the suitability of land within the 10 km radius of 11 Clutha District Council wastewater treatment plants (Lowe Environmental Impact, 2023). These existing WWTP's include Waihola, Milburn (which currently conveys wastewater to Milton), Milton, Balclutha, Stirling, Kaitangata, Kaka Point, Owaka, Clinton, Lawrence, Tapanui, and Heriot. Research undertaken comprised of a desktop assessment to understand the limitations and advantages of land within the 10 km radius of the existing WWTP's. The land area required for irrigation discharge for each WWTP was also calculated. A range of parameters were assessed: • Land use o Nutrient uptake potential • Soil attributes

[9] All costs reported here are the 95th percentile estimates with funding risk contingency but do not include 10-year escalation costs or operational costs.

o Slope and stability o Soil drainage and permeability • Hydrological and hydrogeological attributes o Flood return interval and flood risks o Waterway buffers • Physical restraints o Buildings and bores o Roads and railways o Elevation o River crossing zones Each parameter was assessed to indicate a suitability score: A=Well suited B=Moderately well suited C= Minor Limitations D=Significant Limitations E=Severe limitations NA=Unsuitable areas The report concluded that there are areas of suitable land available for the establishment of a land application system within the 11 Investigation Areas. The Investigation Areas contains sufficient land suited to the land application of wastewater (Zone A and B) in proximity to the existing WWTP's. Most of the suitable land is found to be classed as Zone B but some communities such as Owaka and Tapanui have Zone A land within close proximity of the WWTP. The report recommends iwi consultation and investigations into property ownership, depth to groundwater and costs as next steps for the council.

1.5.1.2. Option 2: pLWRP (preferred option)

45. Option 2 retains many aspects of the Plan Change 8 provisions and introduces an additional test for discharges to water through the introduction of a non-complying activity status for discharges to water.

46. Discharges to land (both new and existing) require a discretionary consent, but discharges to water (both new and existing) will now require a non-complying consent. A non-complying consent can only be granted if the requirements of section 104D of the RMA are met. ORC may grant a resource consent for a non-complying activity only if it is satisfied that either the adverse effects of the activity on the environment will be minor, or that the activity will not be contrary to the objectives and policies of the LWRP. This test will set a higher bar than the discretionary activity rule in the status quo framework.

1.5.1.3. Option 3: Prohibit discharges to water

47. Under this option, existing discharges to water are phased out within the pORPS vision timeframes, and new discharges to water are prohibited. Existing and new discharges to land would be managed by a discretionary consent.

48. As seen in Table 5 below, the territorial authorities most affected by Option 3 are Clutha District Council with 10 discharges to water, and Central Otago District Council with 4 discharges to water. Twelve out of fifteen discharges would have until 2050 to upgrade to land discharge.

Table 5: Timeframes for achieving the visions for each of Otago's territorial authorities

Timeframe	FM/rohe	Discharges	District Council
2030	Upper Lakes rohe	0	Queenstown Lake District Council
2035	Catlins FMU	1	Clutha District Council
2040	Dunedin & Coast FMU	1	Clutha District Council
2045	Dunstan rohe	1	Central Otago District Council
	Roxburgh rohe	0	
2050	Manuherekia rohe	2	
	Lower Clutha rohe	7	Clutha District Council
	Taiari FMU	2	Clutha District Council and Central Otago District Council
	North Otago FMU	1	Waitaki District Council

1.5.2. Clause 3 consultation feedback

49. Draft provisions were sent to Clause 3 parties. Feedback was received from a number of parties. The key issues have been summarised below:

    a. Concern that prohibiting new discharges of wastewater to water may result in unintended consequences. This submitter suggested that making overflows a "prohibited activity" might result in a wastewater network operator not being required to show evidence of their ongoing efforts to reduce or mitigate the effects of overflows that are likely to occur. However, if the consenting criteria was "discretionary" or "non-complying", the wastewater network operator would be obliged to show they have plans in place to minimise the possibility of overflows occurring, and to actively mitigate their effects, if and when they do happen. This feedback has been considered and implemented.

    b. Concern that the definition of "available reticulated wastewater system" does not include approval by owner. This feedback has been considered and the definition of "available reticulated wastewater system" amended to include "the owner of the system accepts the discharge."

    c. Definition of "biosolids" should specify they are derived from human sewage, to exclude dairy biosolids from the rule. This amendment to the definition has been made.

    d. Concern there are no rules for wastewater discharge to land that is not likely to enter fresh water. The drafting has since been updated to "discharges onto or into land including in circumstances where a contaminant may enter water" to capture discharges which may or may not enter water.

    e. The following feedback was received from iwi: Although the policy direction is to avoid wastewater discharges to water and to replace these with discharges to land, some of the drafting is not directive enough and needs to be strengthened. Phasing out existing discharges to water to the greatest extent practicable is too vague - need to see commitment to finding alternatives. Discharges of any wastewater (which could also include untreated water) from existing systems to water as well as to land are a discretionary activity. There is therefore no regulatory incentive for the policy direction to phase out discharges to water. Adverse effects from new discharges should be avoided. Discharges of untreated wastewater should be prohibited. These feedback points relate to pORPS direction, and as such the decision was made to await final confirmation of pORPS before making further changes to the policy framework.

1.5.3. Clause 4A consultation feedback

50. Iwi provided the following feedback on the drafted rules:

a. No distinction is made in the rules between treated and untreated wastewater. Iwi consider that discharge of untreated wastewater to water should be prohibited. Amendments are needed to make discharges of untreated wastewater to water a prohibited activity.

b. Following on from this feedback, the decision was made to retain current drafting. Making overflows a “prohibited activity” might result in a wastewater network operator not being required to show evidence of their ongoing efforts to reduce or mitigate the effects of overflows that are likely to occur (to some extent) regardless, and so put less effort into minimising the chance and consequences of reducing overflows. In this case, a more heavy-handed regulatory approach could conceivably have the unintended consequence of actually reducing the efforts that Local Authorities might otherwise make to reduce the chances or offset the effects of wastewater overflows. If the consenting criteria is “discretionary” or “non-complying,” the wastewater network operator was obliged to show they have plans in place to minimise the possibility of overflows occurring, and to actively mitigate their effects, when they do happen. This obliges network operators to meet performance measures and reduces the incentive to avoid reporting any breaches.

1.5.4. Effectiveness and efficiency assessment

51. Table 6 below identifies and assesses the environmental, cultural, social, and economic benefits and costs anticipated from implementing the proposed options.

52. The resource users impacted by the WW chapter are territorial authorities and ratepayers. The timing of the impacts will relate to the consent expiry dates (see Table 1).

53. It is anticipated that private landowners and developers who discharge wastewater from a small-scale wastewater scheme will not be impacted by the changes proposed, as these types of discharges are usually to land.

54. Costs incurred by rate payers for good quality reticulated systems can benefit downstream users.

Table 6: Benefits and costs for WW – Reticulated wastewater discharges

	BENEFITS	COSTS
Option 1	Plan Change 8 was made operative in September 2022, and is taking some time to implement. Many wastewater consents are	Continuing to allow wastewater discharges to water is a significant issue for iwi. Discharges

	30 years, therefore there can be a significant wait for consents to expire and wastewater schemes to be required to move into the new planning framework. However, the provisions of Plan Change 8 are resulting in some of Otago's territorial authorities investigating options to move discharges from water to land (see example in Table 5: Availability of land for wastewater discharge). Continuity with the current approach benefits plan users. Economic benefits of allowing some discharges to water when the discharging to land is not practicable.	of wastewater resulting in water quality degradation can lead to: • Habitat degradation and loss • Modification of wāhi tūpuna • Loss of safe access to harvest mahika kai • Contamination of mahika kai • Costs of restoration – time and materials • Loss of food source (mahika kai) • Costs of health impacts • Loss of knowledge base • Socio-economic costs of loss of connection Discharges of wastewater to water can have negatively impact environmental, social, and cultural uses of water. Discharges of wastewater to water can negatively affect drinking water and create a risk to human health. Recreational uses of freshwater and ecosystem health can also be negatively affected by direct discharges of wastewater to water.
Option 2 (preferred option)	Phasing out discharges to water where practicable is a more pragmatic approach and avoids some situations where it would be completely unreasonable to require a discharge to land, such as when the ground is frozen. Moving some wastewater discharges from water to land involves upgrading which has flow-on benefits. Newer facilities and new technology will efficiently and effectively treat wastewater to a higher standard than many existing wastewater treatment plants. Sea-level rise and climate change, as well as adaptive planning for population growth can be factored into the long-term planning. Job creation is a beneficial effect of this option. Some of Otago's territorial authorities are already undertaking this planning, such as DCC and CODC.	As with Option 1, continuing to allow discharges to water has a cultural cost for iwi, as well as negatively affecting drinking water, human health, recreational uses of water and ecosystem health. Changing the activity status to non-complying discharges to land creates a new test for these discharges. This tightening of the activity status could result in the requirement for some schemes to move from water to land. The cost considerations of moving a discharge from water to land can be found in Table 4.
Option 3	As with Option 2, there are economic benefits to moving discharges from water and land in the way of job creation and future-proofing new infrastructure. The mauri of the water is protected from new wastewater discharges. Better quality water over time benefits human health, recreational water users,	Territorial authorities may delay reticulating a township if the discharge needs to be to land. This could adversely impact the environment if onsite wastewater systems are too densely located. Areas which may be impacted by this include Outram, Hampden, and Glenorchy. Potential unintended effects of prohibiting new discharges to water (see Clause 3 feedback).

	ecosystem health, biodiversity, and cultural activities such as the gathering of mahika kai.	Under Option 3, there will be more contaminated land created due to wastewater discharges. There is also a financial and amenity cost to neighbouring properties of land treatment facilities. Connecting smaller schemes can have drawbacks. Otago's geography limits the connection of many small schemes. Pipelines to connect wastewater schemes are expensive and carry a risk of damage. Some areas will be unable to discharge to land year-round due to land availability and saturation and will then incur non-compliance or abatement notices. Higher rates can mean loss of other council services (recreational, social housing, etc). Additional costs for water storage.

55. Table 7 below assesses the effectiveness and efficiency of the options in achieving the objectives. Where an option is evaluated as being effective in achieving the objectives in the LWRP they are subsequently evaluated for their 'efficiency.'

Table 7: Effectiveness and efficiency assessment for WW – Reticulated wastewater discharges

	Effectiveness
Option 1	This option will be largely effective in achieving the objective over time as consents come up for renewal, or when new consent applications are made. The requirement to prefer discharges to land over discharges to water unless adverse effects associated with a discharge to land are greater than a discharge to water will result in many discharges transferring to land. A couple of recent examples include: A recent discharge consent[10] for the existing discharge of treated wastewater into the Manuherekia river was granted for 5 years. One of the consent conditions is that the consent holder must prepare a strategy for the removal of the wastewater discharge to the Manuherekia river. The strategy must be provided to ORC by 30 June 2025. Another example is the new land discharge consented in Kingston[11]. This new reticulated wastewater system will eventually service up to 900 homes. The land treatment area will cover up to 25 hectares of land which is located on the opposite side of the development site as Whakatipu-Waimāori/Lake Wakatipu.
Option 2 (preferred option)	Slightly more effective at achieving the objectives than Option 1, due to the non-complying activity status for discharges of wastewater to water. Consents for discharges to water will only be granted if the discharge does not cause adverse environmental effects, or not be contrary to the provisions of the LWRP. This slightly strengthens the preference for land discharge over Option 1.

[10] Resource consent number RM21.566.01

[11] Resource consent number RM20.164.01

Option 3	This is the most effective option for achieving the objectives of the plan by removing wastewater from all freshwater bodies in Otago. However, there will be areas of Otago which will struggle to achieve this due to land availability, suitability, and affordability. In some areas, suitable[12] land is not available within proximity to the reticulated area, while in others, land saturation or the freezing of land can affect land discharge rates, particularly in Central Otago, so alternative disposal may continue to be required.
Efficiency	
Option 1	Option 1 allows the possibility of new and existing discharges to water where it is proven that the environmental effect would be less than a discharge to land.
Option 2 (preferred option)	Similar efficiency to Option 1.
Option 3	The significant effort required to move all discharges from water to land may not result in significantly better environmental outcomes, which lessens the efficiency of this proposal to achieving the objectives.

56. The assessment also needs to consider the risk of acting or not acting if there is uncertain or insufficient information.[13]

57. There is sufficient information on the adverse environmental effects of sewage overflows to warrant the implementation of a phased approach to upgrading reticulated wastewater systems in order to better protect receiving water quality.

58. There is sufficient information on the cultural effects of wastewater and trade discharges to water to warrant a rule framework which discourages new discharges to water from being established.

59. Overall, the information supporting Option 2 is suitably certain and sufficient that there is a minimal risk of acting compared to the status quo.

1.5.5. Conclusion

60. Option 1 is reasonably effective and efficient at achieving the objectives.

61. Option 2 is considered to be slightly more effective and similarly efficient as Option 1.

62. Option 3 is the most effective at achieving the objectives, however, is the least efficient.

[12] Suitability refers to soil type, slope, and proximity to surface water or neighbouring properties, as well as availability of land i.e., cost and zoning considerations. Suitable land for wastewater disposal is often also suitable for housing or horticulture.

[13] Section 32(2)(c), RMA.

63. Overall, the assessment concludes that Option 2 is the most effective and efficient at achieving the objectives of the LWRP.

1.6. Sub-topic: Biosolids

1.6.1. Reasonably practicable options

64. To achieve the relevant objectives, three options have been identified through the policy development process, which included community engagement, review of relevant provisions in other regional plans, and discussion in a series of council workshops:

a. **Option 1**: Permitted activity for Grade Aa biosolids

b. **Option 2**: pLWRP (preferred option)

1.6.1.1. Option 1: Permitted activity for Grade Aa biosolids

65. Option 1 uses the grading system from Guidelines for the Safe Application of Biosolids to Land in New Zealand (New Zealand Water and Wastes Association, 2003) and allows the disposal of grade Aa biosolids to land as a permitted activity.

66. The guidelines set out a grading system with limits for level of pathogens and moisture in treated biosolids. The grading system is made up of two parts. The first part, which is denoted by a capital 'A' or 'B,' represents the stabilisation grade. The second part, denoted by a lower case 'a' or 'b,' represents the chemical contaminant grade. The guidelines propose that the discharge of Aa biosolids to land be handled by way of a permitted activity rule in regional plans and that these biosolids carry a registered Biosolids Quality Mark as a means of providing independent third-party accreditation that the biosolids meet all the relevant process and product standards. Permitted activity conditions include that the biosolids should not be applied to land used for food production, grazing of stock or residential activities. Setbacks from water bodies and other sensitive areas would also be included. It is proposed that the discharge of Ab, Ba or Bb biosolids to land be treated as a discretionary activity requiring a resource consent.

1.6.1.2. Option 2: pLWRP (preferred option)

67. This option consists of a restricted discretionary rule. Discretion will be restricted to matters which affect the risk of environmental contamination, such as loading rate and soil type, and cultural matters, such as whakapapa, mauri, and mahika kai.

68. Policy direction states that the biosolids should not be applied to land used for food production, grazing of stock or residential activities.

1.6.2. Clause 3 consultation feedback

69. The following Clause 3 feedback was received.

a. That the definition of "biosolid" should specify matter derived from human sewage, so as to exclude dairy derived biosolids from the rule.

b. Iwi provided the following feedback: the policy should contain the wording "The site is appropriate for that use considering its whakapapa, mauri, mahika kai and uses of the site, and its connection to other sites in the catchment." This change was made as suggested; however, it was later removed due to the inclusion of APP8 – mana whenua environmental indicators.

1.6.3. Clause 4A consultation feedback

70. Iwi did not provide feedback on biosolids in the Clause 4A process.

1.6.4. Effectiveness and efficiency assessment

71. Table 8 below identifies and assesses the benefits and costs anticipated from implementing the provisions proposed in the options above.

Table 8: Benefits and costs for WW – Biosolids

	BENEFITS	COSTS
Option 1	No consent costs for territorial authorities or others proposing to construct a biosolids facility. Using the 2003 Guidelines would ensure consistency with other regions also using the Guidelines. A clear framework/guidance provides efficiency because expectations are clear for consent applicants. Providing a clear framework may encourage TAs to start planning the disposal of biosolids into their long-term wastewater planning. If the policy results in more uptake of biosolid production, less sludge will go to landfills which is better for the environment. Selling biosolids as a product can be a good income stream for TAs. Economic benefits come from the establishment and running of biosolids processing facilities. During the design and construction phase, significant human resource will be required. Once a facility is running it requires ongoing operation and maintenance. Appropriate environmental standards improve environmental and community outcomes. Clear separation distances benefit existing landowners.	Although they are treated, biosolids can still contain pollutants harmful to the environment and human health. Pollutants found in biosolids can include inorganic contaminants (e.g., metals and trace elements); organic contaminants (e.g., polychlorinated biphenyls, known as PCBs; dioxins; pharmaceuticals and surfactants); and pathogens, e.g., bacteria, viruses and parasites (U.S. Environmental Protection Agency Office of Inspector General, 2018). There is a high tendency that per- and polyfluoroalkyl substances (PFAS) or other emerging contaminants from contaminated soil or groundwater can leach out to the surrounding flora and fauna and could lead to detrimental effects. (Kumar, et al., 2023). There is a significant risk to soil and human health if biosolids are not processed or applied correctly. Cultural risk if biosolids application sites are not suitably located. Biosolids are derived from human waste and therefore should not be placed on sacred sites or areas of significance to iwi. There is a risk that having a permitted activity framework will decrease iwi consultation on appropriate sites for the application of biosolids.

Option 2 (Preferred option)	As with Option 1: Appropriate environmental standards improve environmental and community outcomes. Clear separation distances benefit existing landowners. A clear framework/guidance provides efficiency because expectations are clear for consent applicants. Providing a clear framework may encourage TAs to start planning the disposal of biosolids into their long-term wastewater planning. If the policy results in more uptake of biosolid production, less sludge will go to landfills which is better for the environment. Selling biosolids as a product can be a good income stream for territorial authorities. Economic benefits come from the establishment and running of biosolids processing facilities. During the design and construction phase, significant human resource will be required. Once a facility is running it requires ongoing operation and maintenance.	Consenting costs can be significant, because the nature of the discharge can create community opposition to proposed schemes, such as the failed Luggate proposal (Otago Daily Times, 2013).

72. Table 9 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objective.

Table 9: Efficiency and effectiveness assessment for WW-Biosolids

	Effectiveness
Option 1	Possibly not very effective, as the Guidelines are overdue an update. The guidelines have been criticised by some in the industry as being too stringent, so as to preclude many permitted activities from occurring. An updated biosolids manual *Guidelines for Beneficial Use of Organic Materials on Productive Land* (Water New Zealand, 2017) did not proceed past draft form.
Option 2 (Preferred option)	These provisions are feasible, with no anticipated unintended consequences and a high likelihood of successful implementation, compliance, and ability to monitor and enforce. To protect soil health, each consent application for the discharge of biosolids should be subject to an environmental impact assessment as well as community and iwi consultation.
	Efficiency
Option 1	As the guidelines are out of date, this option presents an environmental risk which undermines any efficiency gains from a permitted activity framework.
Option 2 (Preferred option)	The cost benefit analysis demonstrates that a consenting approach, although potentially more costly, will be more efficient than a permissive approach which could lead to soil contamination and risk to human health.

73. The assessment also needs to take into account the risk of acting or not acting if there is uncertain or insufficient information.[14]

[14] Section 32(2)(c), RMA.

74. There is sufficient information on the current disposal methods of sludge in Otago to warrant a new approach – that is, a framework to guide wastewater operators and give them certainty around the expectations of ORC in the disposal of biosolids. If this framework encourages operators to beneficially reuse biosolids, the framework will be successful in reducing the burden of sludge into landfills.

75. Overall, the information supporting Option 2 is suitably certain and sufficient that there is a minimal risk of acting compared to the status quo.

1.6.5. Conclusion

76. The effectiveness and efficiency assessment indicates that, overall, the proposed amendments are likely to be more effective at achieving the objectives of the pLWRP and more efficient than the status quo. Given the efficiency and effectiveness of Option 2, it is likely to be the most appropriate way to achieve the objectives of the pLWRP.

2. WW – Wastewater - Onsite

2.1. Introduction

77. Onsite wastewater treatment systems dispose of wastewater on the same property at which it was collected. Onsite systems can be used for a variety of property types for the disposal of sewage, greywater or trade and industrial waste. Types of systems include basic holding tanks (known as septic tanks), aerated treatment systems, pit toilets and composting toilets.

2.1.1. Onsite wastewater treatment systems

78. Onsite wastewater treatment systems disposing of sewage usually consist of a primary tank in which the solid waste settles, separating from the liquid waste. When a volume threshold is reached, the solid waste ("sludge") is pumped out and transported offsite for disposal at a wastewater treatment plant, or to a landfill. The liquid waste is disposed of to land, either via a soakpit[15], or a sub-surface disposal field. Some onsite wastewater systems use a secondary tank with aeration treatment, or UV treatment to attain a higher quality of discharge. To sufficiently treat the discharge, appropriate soils and site-specific design are often required.

2.1.2. Pit toilets

79. Pit toilets are also referred to as long drops. Discharges of sewage directly enter the ground, with standard pit depth being between 0.9m and 1.3m (Department of Conservation, 2009). Once the pit has reached capacity the pit is covered over with a thick layer of soil. The design, siting and maintenance of a pit toilet should not allow sewage to pond above the ground or enter any surface water body.

[15] A below ground pit filled with gravel which allow it to soak naturally into the soil.

2.1.3. Composting toilets

80. Composting toilets have risen in popularity in recent years, partly due to the proliferation of tiny homes and the rise in 'off-grid' lifestyles. The discharges from composting toilets need to be correctly managed to avoid contamination of surface water, or food crops.

81. To reduce any risk of soil or water contamination, discharges of solid waste from composting toilets should be anaerobically decomposed for a year before being disposed of to land in the form of a compost. In New Zealand, it is not culturally appropriate to use this compost for food production related activities, such as horticulture or grazing stock. According to the Hazardous Activities and Industries List[16] the disposal of composting toilet waste to land does not result in contaminated land.

2.1.4. Greywater

82. Greywater is liquid waste from domestic sources including sinks, basins, baths, showers, and similar fixtures. It does not include sewage, or industrial and trade waste. In most cases greywater is discharged into a wastewater system, however in some cases it is filtered onsite and re-used for garden irrigation and other non-human contact needs. Contaminants commonly found in greywater include soaps, detergents, oils, greases, food waste. Like sewage, pathogens may also be present.

2.1.5. Industrial and trade waste

83. Discharges from industrial and trade waste activities are either discharged to a reticulated wastewater system under a trade waste bylaw, or treated and then discharged onsite, in a similar fashion to wastewater.

84. Typical industries include abattoirs, dairy, food and beverage manufacturing, food outlets, vehicle yards, panel beaters and car wash facilities, laundromats, metal works, concrete manufacturers, chemical industries, and health facilities. Contaminants are dependent on the type of industry involved, and can include fats, oils and greases, nitrogen, septic wastes, heavy metals, and a range of chemicals.

2.2. Issues

85. In general terms, the environmental, cultural, social, and economic issues the WW chapter in the LWRP seeks to address are:

    a. Onsite discharges affect water quality.

    b. Cumulative effects of onsite systems density.

    c. Discharges from onsite systems contaminate groundwater.

    d. Greywater re-use can be harmful to humans and crops.

86. Each of these issues is described in turn below.

[16] Hazardous Activities and Industries List (HAIL) includes wastewater treatment and waste disposal to land, excluding where biosolids have been used as soil conditioners.

87. Additional policy issues with the status quo policy context that the WW chapter seeks to address are outlined in Section 2.3 of this chapter.

2.2.1. Onsite discharges affect water quality

88. Otago's State of the Environment report notes that water quality is generally poorer at sites located on smaller, low-elevation streams that drain agricultural or urban catchments, including the Lower Clutha rohe, Dunedin and Coast FMU and North Otago FMU (Ozanne, Levy, & Borges, State and Trends of Rivers, Lakes, and Groundwater in Otago 2017 - 2022, 2023b). Furthermore, elevated *E. coli* and nitrate concentrations were generally observed in areas with intensive land use, septic tanks, and insecure bores. Although a lack of detailed information on land use changes or changes to management practices significantly restricts any analysis for investigating the effect of land use activities on water quality, it is clear that urban discharges have an impact on groundwater and surface water quality.

2.2.2. Cumulative effects of onsite wastewater treatment system density

89. It has been estimated that there are at least 14,600 onsite wastewater treatment systems in Otago (Otago Regional Council, 2015). It is likely this number has risen in the last eight years due to rural residential development, particularly in the Queenstown Lakes and Central Otago districts. The report noted up to half of these onsite systems may be in some stage of failure because of their age and/or management. The location of these systems means that up to 70% of Otago's aquifers are at medium or high risk of contamination. The current rules limit ORC's ability to regulate systems that pre-date the Regional Plan: Water for Otago 1998, even though these systems are now at least 35 years old. The current rules do not guide consent planners on requirements for secondary or advanced treatment in environmentally sensitive areas, for example where soil is porous, groundwater is high, or water quality is degraded.

2.2.3. Discharges from onsite systems can contaminate groundwater

90. The Regional Plan: Water for Otago does not adequately protect groundwater from discharges of wastewater into soakpits. Discharges to land should have an adequate separation between the discharge point and the groundwater level. If the soils are porous (such as gravel and sands), then the separation distance needs to be greater (Pattle Delamore Partners Ltd, 2023).

2.2.4. Greywater re-use can be harmful to humans and crops

91. While the recycling of greywater has been suggested as beneficial for water shortages, Maimon et al. (2010) concluded "that the use of untreated greywater is not recommended, especially in multihousehold systems as it may compromise public health, with single household systems posing more likely risks to the environment." Furthermore, research has found that crops irrigated with greywater can be contaminated, rendering the practice unsafe (Nel & Jacobs, 2019).

2.3. Status quo

92. This section provides an overview of the management of wastewater through the current provisions in the RPW and Waste plan, as well as describing the issues associated with the status quo.

2.3.1. Regional policy

93. Under policy LF–FW–P16 of the pORPS: Minimise the adverse effects of direct and indirect discharges containing animal effluent, sewage, greywater and industrial and trade waste to fresh water by:….(2) requiring: (a) new discharges containing sewage or industrial and trade waste to be to land, (c) that all discharges containing sewage or industrial and trade waste are discharged into a reticulated wastewater system, where one is made available by its owner, unless alternative treatment and disposal methods will result in improved outcomes for fresh water, (e) on-site wastewater systems… to be designed and operated in accordance with best practice standards, (3) to the greatest extent practicable, requiring the reticulation of wastewater in urban areas, and (4) promoting source control as a method for reducing contaminants in discharges.

2.3.2. Regional plan

94. The existing Regional Plan: Water for Otago (RPW) contains water quality objectives that relate to all of the types of discharges managed in the WW chapter. To summarise those provisions, the water quality objectives aim to maintain the quality of fresh water and enhance it where it is degraded; to enable the discharge of water or contaminants in ways that maintain water quality and supports natural and human use values, including Kāi Tahu values; to have individuals and communities manage their discharges to reduce adverse effects, including those that are cumulative, on water quality; to avoid objectionable discharges of water or contaminants; and to allow discharges of water or contaminants that have minor or less than minor adverse effects or that have short-term adverse effects.

2.3.3. Onsite wastewater treatment systems

95. Under the RPW, discharge of sewage from onsite wastewater systems are permitted if conditions are met. There are fewer conditions for systems which were installed before 1998. Those systems need to operate to ensure there is no direct discharge of human sewage to water, and effluent does not run off to any other person's property or cause flooding, erosion, land instability, sedimentation, or property damage.

96. Systems installed after 1998 are subject to additional conditions, such as volume limits, location, setbacks to water bodies and bores. These rules were drafted when the RPW was notified, in 1998, and allowed existing systems to remain while ensuring higher standards for new systems. Although this approach was sensible at the time, it has led to the perverse outcome of older systems requiring no environmental monitoring, while new systems (which may be located right next door) require consent and consent monitoring. This effect is known as "grandfathering."

2.3.4. Pit toilets

97. The management of discharges from long drops/pit toilets also include grandfathering provisions. Discharges from pit toilets established before 1998 are permitted if there is no direct discharge of human sewage to water. Discharges from pit toilets established after 1998 have additional conditions to be met relating to setbacks from surface water and bores, and construction and location requirements. If these conditions are not met, a discretionary consent is required.

2.3.5. Composting toilets

98. There is no rule framework for composting toilets in the Water plan or the Waste plan, however the Waste Plan manages compost. The definition of compost in the RPW is: "The biological reduction of organic waste to a relatively stable product." Composting of organic waste is permitted if conditions are met relating to groundwater seepage, leachate, and setbacks from water bodies and bores. The compost should not cause a nuisance or be noxious, dangerous, offensive, or objectionable beyond the boundaries of the property, and the composting should be undertaken on the property from which the majority of the material is sourced. If these conditions are not met, the activity requires a discretionary consent.

99. The status quo is confusing for individuals who want to install a composting toilet on their property, as there is not clear guidance around ORC's expectations for managing this activity. Table 10 below shows the small number of consents enquires about compost toilet management.

Table 10: Number of composting toilet consent enquiries per year between 2014-2022

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Number of enquiries	1	1	2	3	4	2	2	3	0

2.3.6. Greywater

100. The RPW refers to greywater as "sullage," which is defined as the wastewater from sinks, basins, baths, showers, and similar appliances, but does not include sewage. The discharge of sullage/greywater to water or land is currently permitted with conditions relating to quality of the discharge and adverse effects on the receiving environment. If the permitted activity conditions are not met, a discretionary consent is required.

2.3.7. Industrial and trade waste

101. RPS direction (LF–FW–P16) is to minimise the adverse effects of direct and indirect discharges containing animal effluent, sewage, greywater and industrial and trade waste to fresh water by:(1) phasing out existing discharges containing sewage or industrial and trade waste directly to water to the extent practicable, and requiring: new discharges containing sewage or industrial and trade waste to be to land, that all discharges containing sewage or industrial and trade waste are discharged into a reticulated wastewater system, where one

is made available by its owner, unless alternative treatment and disposal methods will result in improved outcomes for fresh water.

102. Under section 15(1)(d) of the RMA no person may discharge any contaminant from any industrial or trade premises onto or into land unless the discharge is expressly allowed by a rule in a regional plan or a resource consent. Therefore, discharges of contaminants from industrial and trade premises are treated differently to other discharges of contaminants to land (which are allowed unless a rule in a plan or other legislation says otherwise).

103. The RPW manages discharges from an industrial or trade premises as a discretionary activity. Policy direction prevents contamination through the use of techniques to trap debris, sediments and nutrients present in runoff; measures to reduce and/or attenuate stormwater being discharged from rain events; and consideration of options for discharging to land, in preference to discharging directly to water.

104. The RPW does not have policy guidance for discharge quality limits for industrial and trade waste. ORC's contents team has recently updated standard consent conditions the discharge of winery wastewater, to ensure consent conditions are appropriate. Discharges from industrial and trade waste processes can contain various contaminants, many of which are toxic if discharged to freshwater (GHD, 2020). Some examples of current industrial and trade waste consents include discharges of wastewater from a milk processing plant, discharges of winery wastewater, and discharges from a concrete batching plant (Table 11 – Current consents held under RPW provisions for discharge of industrial and trade waste).

105. Discharges from landfills are currently consented under industrial and trade waste rules, however in the LWRP these will be managed under the WASTE chapter.

Table 11: Current consents held under RPW provisions for discharge of industrial and trade waste

Discharge type	Description	Expected contaminants
Land	To discharge treated industrial wastewater to land via spray irrigation for the purpose of disposing of milk processing plant wastewater.	Fats and greases (FOG), pH issues, high nitrates
Land	To discharge wastewater including grease trap waste, mud tank/sump waste and winery wastewater to land for the purpose of disposing of industrial wastewater from commercial activities.	High biochemical oxygen demand, FOG, high nitrates, pH issues
Land	To discharge human sewage to land for the purpose of disposal of human sewage and trade waste from a cellar door, event venue including a kitchen and accommodation units.	Fats and greases, pH issues
Water	To discharge contaminants into water, for the purpose of disposing of industrial wastewater and stormwater from a concrete batching plant.	pH issues, suspended solids, alkalinity (beneficial)

2.4. Objectives

106. Section 32(1)(b) requires an examination of whether the provisions in a proposal are the most appropriate way to achieve the objectives. The objectives and environmental outcomes that are particularly relevant for this topic are:

a. The following objectives in the IM – Integrated management chapter:

i. IO-O1 Te mana o te Wai

ii. IO-O2 Relationship of Kāi Tahu to freshwater

iii. IO-O3 Long-term visions and environmental outcomes

iv. IO-O4 Ki uta ki tai/integrated management

v. IO-O5 Manahau āhuarangi/climate change

vi. IO-O8 Land and soil resources

vii. IO-O9 Community well-being

b. The following environmental outcomes included as objectives in chapters FMU1 to FMU5 (including chapters CAT1 to CAT5):

i. FMU1 to 5-O1 Ecosystem health

ii. FMU1 to 5-O2 Human contact

iii. FMU1 to 5-O3 Threatened species (habitat)

iv. FMU1 to 5-O4 Threatened species (recovery)

v. FMU1 to 5-O5 Mahika kai (condition)

vi. FMU1 to 5-O6 Mahika kai (access, harvest, and use)

vii. FMU1 to 5-O7 Natural form and character

viii. FMU1 to 5-O8 Drinking water supply (source water)

ix. FMU1 to 5-O9 Animal drinking water

x. FMU1 to 5-O10 Wāhi tupuna

xi. FMU1 to 5-O11 Taoka species

xii. FMU1 to 5-O12 Fishing

xiii. FMU1 to 5-O14 Cultivation, and production of food, beverages, and fibre.

c. WW-O1 - Wastewater.

2.5. Sub-topic: Onsite wastewater treatment systems

2.5.1. Reasonably practicable options

107. To achieve the relevant objectives, three reasonably practicable options have been identified through the policy development process, which included community engagement. review of relevant provisions in other regional plans, and discussion in a series of council workshops:

a. **Option 1**: Status quo

b. **Option 2**: LWRP (preferred option)

c. **Option 3**: LWRP + Warrant of fitness

108. For this activity, the status quo was not considered as an option, due to the inadequate regulation of pre-1998 systems, and associated risk to water quality.

2.5.1.1. Option 1: Status quo

109. The status quo is described in section 2.3. It requires consent for some onsite wastewater treatment systems, with less stringent conditions for pre-1998 systems, and allows discharges of greywater and discharges from pit toilets with minimal conditions and does not include guidance for discharges from composting toilets. Option 1 retains discretionary activity status for discharges of industrial and trade waste.

2.5.1.2. Option 2: LWRP (preferred option)

2.5.1.2.1. Onsite wastewater treatment systems

110. The policy direction in the RPW is not specific to onsite wastewater and is lacking in detail. Therefore, there is significant change between the policy direction in the RPW and the LWRP. The degree of change is largely driven by the PORPS requirements under LF-FW-P16, namely promoting reticulation, requiring reduction of contaminants in discharges, and requiring systems to be designed and operated in accordance with best practice standards.

111. Additional policy direction is the result of clause 3 feedback from territorial authorities. This requires additional consideration and collaboration with TAs for sites which are within an urban zone and are adjacent to a reticulated network. This policy was further amended due to clause 4A feedback.

112. Further policies are a result of internal feedback. Discharges of wastewater into soak-pits will be phased out and replaced with land application systems.

113. Requiring records for all systems, both permitted and consented, will allow ORC to build a register to type and location of each system. This will benefit ORC if further plan changes require inspections of permitted systems. Requiring secondary treatment for all new systems and for existing systems in drinking water protection zones resulted from internal feedback and discussion.

114. The activity status for onsite systems remains permitted, defaulting to discretionary, as it is in the RPW. However, there are two key changes. The first is that the grandparenting rule is removed, allowing existing systems to remain operational if conditions are met. The conditions can be more stringent for new systems. The second change is the permitted activity conditions for both new and existing systems have been updated to ensure best practice is followed. These include:

a. No increase in volume. This is considered more effective than the common condition of a maximum volume of 2000 l/day. Additionally, this condition will allow existing systems which have been appropriately designed and sized to continue to operate without a consent.

b. No available reticulated system. This results from the RPS and LWRP policy direction.

c. Advice was sought from Pattle Delamore Partners Ltd (PDP), a company which assesses environmental effects from wastewater management systems. Their report recommended permitted activity conditions for slope, soil types and volume to be based on the AS/NZ 1547. They advised the distance between the discharge and the groundwater levels should be 600 mm in most cases, with a 2-meter distance in porous soils[17].

d. The RPW setback from bores is 50 meters. PDP advised a minimum distance of 100 meters from bores for a permitted activity. Therefore, systems which were permitted under the RPW which are more than 50 meters from a bore but within 100 meters of a bore will now require consent.

e. Setbacks from bores and waterbodies will capture some existing systems which now will require consent. These systems will now be more than 26 years old and are likely to be a septic tank with a direct discharge to soil/gravel. It is important that these systems are reviewed by ORC to ensure that systems within 50 m of a bore or water body are designed and maintained so as to reduce health and environmental risks.

f. Any system within a drinking water protection zone will need to be upgraded to achieve secondary treatment.

g. Some conditions are simply clarifying good practice, such as: the discharge should not include hazardous waste or pests; the discharge should not be via deep soakage (which can contaminate groundwater) or spray irrigation.

h. Operation and maintenance of systems should be in accordance with NZ standards – this is a result of the RPS direction and also internal feedback.

i. The requirement to register the system with ORC will allow ORC to build up a more complete picture of onsite systems in the region.

115. The same conditions apply to new systems, with additional requirements:

a. There is a site area and density threshold – a system on any site smaller than 2 hectares, or any system on a site which already has a system installed, will require a consent. This will capture a lot of systems on lots smaller than 2 hectares which under the current plan would be permitted. It is important for ORC to review these systems, to ensure they are not negatively impacting on groundwater quality from density.

b. All new systems must achieve secondary treatment to remain a permitted activity. If a consent is applied for a primary system, it will only be granted if there is low risk of adverse effects on the environment and human health.

2.5.1.2.2. Pit toilets

116. New permitted activity conditions for existing pit toilets will require connection to reticulation where available, setbacks from water bodies, groundwater and bores, and prevention of the discharge of hazardous and pest substances, as well as conditions relating to operation and maintenance.

[17] Defined as Category 1 soils in the AS/NZS 1547:2012 (Standards New Zealand, 2012)

117. New pit toilets will contain the same permitted activity conditions as existing, with an additional condition requiring that the section is larger than 20 hectares. On sections smaller than 20 hectares it is assumed that another solution may be utilised, such as a composting toilet, or a tank from which the effluent pumped out and disposed of off-site.

2.5.1.2.3. Composting toilets

118. This option would include policy directing appropriate management of composting toilets waste, such as avoiding the application of composted waste onto land used for food crops or grazing, and setback distances from surface water bodies.

119. A permitted activity aligns with the general composting rules, contained in the WASTE chapter. Permitted activity conditions require the material to be composted for at least 12 months before discharge into or into land; the working in of the material into soil; and setbacks from water bodies and bores. Additionally, the discharge should not cause any contamination or damage to any other persons property or occur on land used for growing crops or grazing animals.

2.5.1.2.4. Greywater

120. The status quo permits the discharge of greywater directly to water through a permitted activity rule with conditions. The proposed LWRP framework does not allow discharge directly to water. Rather, it allows discharges to land where they may enter water, with setbacks from water bodies, groundwater, and bores.

121. Additional permitted activity conditions include the prevention of any hazardous or pest substance, and conditions relating to greywater systems authorised under the Building Act 2004.

2.5.1.2.5. Industrial and trade waste

122. Option 2 proposes a permitted activity for small low risk discharges of industrial and trade waste to land, with setback distances from surface water, bores, and groundwater. Larger discharges to land will still require a discretionary consent, while discharges to water will be non-complying.

2.5.1.3. Option 3: Warrant of fitness

123. This option would have the same requirements as Option 2, but with the addition of a warrant of fitness programme for new and existing onsite wastewater treatment systems.

124. Some councils across New Zealand, including Auckland and the Bay of Plenty, have implemented a warrant of fitness programme to regulate onsite wastewater treatment systems (Auckland Council, 2022). Auckland's Safe Septic programme is a region-wide compliance system requiring property owners with onsite wastewater systems to provide regular maintenance records showing their systems are in good working condition. It has included the creation of a database of 45,000 onsite wastewater systems. Staff actively monitor systems and request maintenance records from the owners. This helps compliance staff to monitor problems and prioritise responses. The communication with property owners also highlights the importance of regular maintenance for preventing harm to the environment.

125. This approach was promoted in the draft National Environmental Standard for Onsite Wastewater Systems, which was developed in 2008 but not finalised (Ministry for the Environment, 2008).

2.5.2. Clause 3 consultation feedback

126. The draft provisions were sent to Clause 3 stakeholders and feedback on the onsite wastewater provisions was received. These points have been summarised below:

a. Concern that the territorial authority should be involved in the decision-making of where these consents should be granted as they may affect the strategic extension of, or potentially new, reticulated wastewater networks. As a result of this feedback, amendments were made to the policy direction, requiring that consent applications in urban zones adjacent to a reticulated area are only granted with agreement from the wastewater service provider.

b. Iwi provided the following feedback:

   i. The policy and rules for onsite wastewater systems do not adequately address the potential for cumulative effects from multiple systems. Need policy to address cumulative effects. This point resulted in the draft provisions being amended to only allow new systems where there are currently no existing systems on site.

   ii. Should there be an upper limit on volume of discharge - earlier draft had 2000 l/day. The drafting was amended to include a permitted activity condition to ensure that the volume of the discharge has not increased as a result of an extension to the building, addition of buildings, or a change of use of the building since the system was established.

   iii. Concern that the greywater provisions as drafted would require consent for individuals wanting to pour greywater into a garden. As a result, the greywater provisions were updated to specify that some conditions are only necessary when a greywater system authorised by the Building Act 2004 is being used.

c. Permitted activity conditions for small scale industrial and trade wastes do not limit the range of contaminants that could be discharged, except for excluding contaminants that fall under HSNO legislation. Should not have permitted activity for unknown contaminants. This feedback was considered alongside the data ORC holds on the current consents (Table 11: Current consents held under RPW provisions for discharge of industrial and trade waste) for this activity. It was considered that allowing a small discharge to land is unlikely to affect either discharge practices or the receiving environment, due to the very small number of consents and the very stringent permitted activity conditions. General support was shown for clearer and more stringent management of the effects of on-site wastewater systems.

2.5.3. Clause 4A consultation feedback

127. Iwi authorities provided the following feedback:

128. Although the policy direction for on-site wastewater systems includes some consideration of cumulative effects in urban or "urban adjacent" areas, it does not address these effects for developments of multiple households that are not adjacent to urban areas (for example in rural-residential and coastal areas). Implementation of the policy direction in rules is further limited to an exclusion from the permitted activity if there is an available reticulated system that could be used instead. Ensure that policies and rules to manage the cumulative effects of on-site wastewater systems apply to any multiple household developments wherever they occur.

   a. Following on from this feedback, an amendment was made to WW-P5, requiring developments with multiple dwellings to demonstrate how onsite wastewater treatment systems will better achieve the environmental outcomes than a reticulated wastewater system.

2.5.4. Efficiency and effectiveness assessment

129. Table 12 below shows the minimum, maximum, and median processing costs for resource consent applications that resulted in at least one discharge permit for residential wastewater discharges to land being issued. The "number of examples" column shows how many applications resulted in that number of consents being issued. For example, in the 2022/23 financial year, there were 30 resource consent applications that resulted in one resource consent being issued.

130. The information shows that most resource consent applications for residential wastewater discharges to land result in one consent being issued. Over the two financial years, the median total cost for applications that resulted in one consent being issued was relatively consistent, ranging from $2,666.40 to $3,018.39.

Table 12: Processing costs for discharges of residential wastewater to land

Financial year	Number of consents issued	Minimum cost	Maximum cost	Median total cost	Number of examples
2022/23	1	$444.78	$6,639.97	$2,815.32	30
2023/24	1	$2,002.28	$6,469.00	$3,018.39	20
	2	$2,403.85	$3,483.84	$2,666.40	6

131. This topic will affect some areas of Otago more than others. Areas which are not reticulated for wastewater will be the most affected, and for some individuals the upgrade of an onsite wastewater treatment system will be a significant cost.

132. An increase in ORC's communications is required to raise awareness of new on-site systems requirements, particularly for increased maintenance. This will form part of the non-regulatory and implementation work programme to support the LWRP.

133. Table 13 identifies and assesses the benefits and costs anticipated from implementing the provisions proposed in the options above. These provisions will impact:

a. Communities/individuals who rely on onsite wastewater treatment systems and are required to upgrade due to location, system type, age of system, or performance.

b. Those who are looking to install a new onsite wastewater treatment system.

c. The Department of Conservation – approximately 50 pit toilets in total.

d. Rural landowners with pit toilets rather than reticulated or septic tank systems – numbers are judged to be very low.

e. Individual households or mobile homes (tiny homes) that use composting toilets.

f. Individual households who re-use their greywater.

g. Industries that discharge trade and industrial waste onsite, such as concrete manufacturers, chemical industries, dairy processing plants, meat processing plants, wineries, and fuel stations.

Table 13: Benefits and costs for WW - Wastewater

	BENEFITS	COSTS
Option 1	No change for plan users.	Lack of guidance for composting toilets is confusing and unhelpful for plan users. Allowing discharges of greywater directly into water is not prioritising the health of the water.
Option 2 (preferred option)	Better protections for private drinking water supplies due to increased separation distances of 100 metres from a bore and up to 2 metres from groundwater. ORC could require upgrades where and when deemed necessary from an environmental risk perspective. Improving degraded systems will Better protection for ecological and human health due to pre-1998 systems no longer permitted with minimal conditions. Better guidance for composting toilets benefits users and ORC consent staff. Removing permitted discharges of greywater directly into water benefits water users and improves water quality. More stringent permitted activity conditions for pit toilets will better protect water quality.	Increased costs for higher design standards. A secondary system typically costs several thousand dollars more than a primary system to install and will also have higher running costs due to more regular maintenance needs. The costs vary greatly depending on slope, soils, and access; however, higher treatment will incur higher capital and maintenance costs. More systems will require a consent, as existing systems within 100 m of a bore will now require consent and new systems on sections under 2 hectares will require consent. Costs to upgrade to secondary treatment for any system in a drinking water protection zone. There may be existing pit toilets which require consent due to new setback conditions. This will probably affect DOC as the owner of the majority of Otago's pit toilets. Any existing discharge of greywater to water will need to be redirected to land or obtain consent to continue.
Option 3	The benefits listed above, as well as: Better record-keeping of locations, type, and condition of all the onsite wastewater treatment systems in Otago will assist with ongoing compliance and monitoring, leading to better	The costs noted above, as well as: Council resources required to administer the programme, and to inspect more than 15,000 onsite wastewater treatments systems. Costs to individuals in providing warrant of fitness information to Council.

	BENEFITS	COSTS
	environmental outcomes and less risks to human health. Higher quality discharges ad better outcomes for water quality, soil health, ecosystem health due to better overall compliance.	

134. Table 14 below assesses the effectiveness and efficiency of the proposed provisions in achieving the objectives.

Table 14: Efficiency and effectiveness assessment for onsite wastewater

Effectiveness	
Option 1	This option does not effectively regulate pre-1998 onsite wastewater treatment systems, composting toilets, or discharge of greywater to water, therefore it is not very effective at achieving the objectives of the LWRP.
Option 2 (preferred option)	A more comprehensive and stringent planning framework including requiring consent for discharges of sewage (onsite, pit and composting toilets) within waterbody and bore setback distances and permitting greywater discharges to land will be more effective at achieving the objectives of the LWRP. From consent data it is apparent that discharges of small volumes of industrial and trade waste are not being consented under rule 12.B.4.1 in the RPW. This may be because: a) they don't exist or b) they are being done without ORC's knowledge. Therefore, it is more effective to permit these discharges with conditions.
Option 3	This option has all the effectiveness of Option 2, and with the additional compliance programme is the most comprehensive method of regulating onsite wastewater systems and therefore the most effective option.
Efficiency	
Option 1	This option does not provide guidance for composting toilets, which decreases efficiency for both applicants and ORC consents team. Efficiency is lessened, as time and resources are taken up in the consenting of small-scale discharges of trade and industrial waste to land.
Option 2 (preferred option)	This option aims to achieve the objective through clear policy direction and permitted activity conditions to ensure systems in high-risk areas are upgraded. It is considered to be reasonably efficient at achieving the objective. It is considered to be efficient to provide guidance on composting toilets for plan users. Retaining a permitted activity for discharges of greywater to land and discharges from pit toilets to land is more efficient for ORC resources and plan users than requiring consent for all discharges. Option 2 is the most efficient option for discharges of industrial and trade waste, as low risk discharges of trade to land do not require consent. This allows plan users to undertake small sale discharges to land in line with the permitted activity condition, and frees up council time for larger scale discharges, and discharges to water.
Option 3	The warrant of fitness approach to the regulation of onsite wastewater treatment plants may not increase the efficiency of onsite wastewater management. Overall, it was considered that a WOF programme could be rolled out independent of the LWRP, as it is largely a compliance matter. The main components of the warrant of fitness programme are correct regulatory settings, sufficient budget, and trained resource. The LWRP will

	contain clear regulatory framework to identify where and when systems should be upgraded and will require all systems (permitted and consented) to register with ORC. This will ensure that ORC can keep a register of the type and location of all systems in Otago and will assist with the roll out of a warrant of fitness scheme in the future, should Council decide to take this proactive compliance approach.

135. The assessment also needs to take into account the risk of acting or not acting if there is uncertain or insufficient information.[18]

136. There is sufficient information regarding the cumulative effects of onsite wastewater systems, and the effects of poorly maintained onsite wastewater systems to warrant the implementation of a more detailed and stringent rule framework. Overall, the information supporting Option 2 is suitably certain and sufficient that there is a minimal risk of acting compared to the status quo.

2.5.5. Conclusion

137. The effectiveness and efficiency assessment indicates that, overall, Option 2 will be more effective at achieving the objectives of the pLWRP and more efficient than the status quo. Given the efficiency and effectiveness of this option, it is likely to be the most appropriate way to achieve the objectives of the pLWRP.

[18] Section 32(2)(c), RMA.